EV183648204

(19) BUNDESREPUBLIK DEUTSCHLAND

DEUTSCHES PATENT- UND MARKENAMT

(12) **Offenlegungsschrift**

(10) **DE 100 51 793 A 1**

(51) Int. Cl.7:
E 04 B 1/38
E 04 B 1/58

(21) Aktenzeichen: 100 51 793.5
(22) Anmeldetag: 18. 10. 2000
(43) Offenlegungstag: 31. 5. 2001

DE 100 51 793 A 1

(66) Innere Priorität:
299 18 339. 4 18. 10. 1999
199 60 185. 2 14. 12. 1999

(71) Anmelder:
Bulldog-Simpson GmbH, 28857 Syke, DE

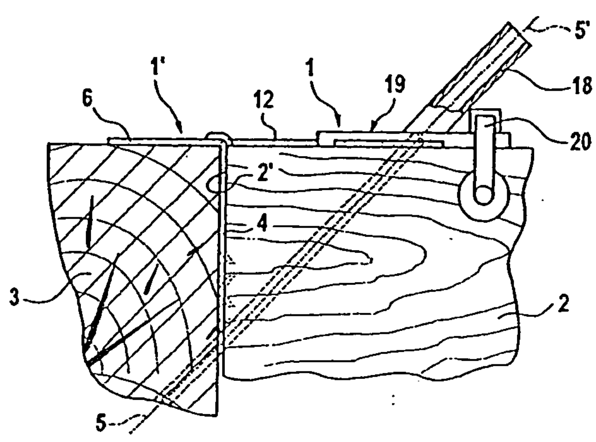
(74) Vertreter:
BOEHMERT & BOEHMERT, 28209 Bremen

(72) Erfinder:
Werner, Hartmut, Dr.-Ing., 76706 Dettenheim, DE;
Wilhelmi, Jürgen, Dipl.-Volksw., 76706 Dettenheim, DE

Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

(54) Holzverbinder sowie Zuschnitt für sein Blechformteil

(57) Holzverbinder (1) zum insb. i. w. verdeckten, stirnseitigen Anschluß eines aus Holz oder einem Holzwerkstoff bestehenden, im montierten Zustand unter Last stehenden ersten Balkens ("Nebenträger") (2) an ein Bauteil, insbesondere einen quer zum ersten Balken (2) verlaufenden zweiten Balken ("Hauptträger") (3), bestehend aus
a) einem i. w. verlustfrei aus einem Blechzuschnitt gefertigten, abschnittsweise abgekanteten Stahlblechformteil (1'), welches drei Flansche (4, 6, 12) aufweist, nämlich
aa) einen an die zu anschließende Stirnfläche (2') des Nebenträgers (2) anzulegenden Befestigungsflansch (4),
ab) einen an die Oberseite des Hauptträgers (3) anzulegenden und dort mit Befestigungsmitteln wie Nägeln zu befestigenden ersten Auflagerflansch (6), und
ac) einen an die Oberseite des Nebenträgers (2) anzulegenden und dort mit Befestigungsmitteln wie Nägeln zu befestigenden zweiten Auflagerflansch (12),
jeweils an der ihnen zugeordneten Anlagefläche mit Nägeln o. dgl. zu befestigen sind, und jeweils mit Durchgangsbohrungen für diese Befestigungsmittel versehen sind, sowie
b) wenigstens einem von der Oberseite des einen Trägers (2 oder 3) aus schräg zum Befestigungsflansch (4) einzubringenden, im montierten Zustand die vertikale Erstreckungsebene des Befestigungsflansches (4) durchsetzenden, d. h. sich bis in den anderen Träger (3 bzw. 2) erstreckenden, länglichen Befestigungsmittel (11) wie einer Schraube, wobei das in stirnseitiger Draufsicht auf den Hauptträger ...



DE 100 51 793 A 1

EV 183648204

19 FEDERAL REPUBLIC OF GERMANY

12 **Offenlegungsschrift**
[Unexamined Application]

10 **DE 100 51 793 A1**

51 Int. Cl.^{7}:
E 04 B 1/38
E 04 B 1/68

GERMAN PATENT AND TRADEMARK OFFICE

21 Serial No.: 100 51 793.5
22 Application date: 18 October 2000
43 Date laid open: 31 May 2001

66 Domestic priority:
299 18 339.4 18 October 1999
199 60 185.2 14 December 1999

71 Applicant:
Bulldog-Simpson GmbH, 28857 Syke, DE

74 Agent:
BOEHMERT & BOEHMERT, 28209 Bremen

72 Inventors:
Werner, Hartmut, Dr.-Ing., 76706 Dettenheim, DE; Wilhelmi, Jürgen, Dipl.-Volksw., 76706 Dettenheim, DE

The following text is taken from the documents filed by the Applicant

54 Wood connector as well as blank for its sheet-metal formed part

57 A wood connector (1), especially for forming a substantially concealed joint between the end face of a first beam ("secondary girder") (2), which is made of wood or of a wood material and which in the assembled condition is under load, and a structural member, especially a second beam ("main girder") (3) oriented crosswise relative to the first beam (2), comprising
a) a sheet-steel formed part (1'), which is made substantially without waste from a sheet-metal blank and is bent over in portions such that it has three flanges (4, 6, 12), namely
aa) a fastening flange (4) to be applied against the end face (2') with which the secondary girder (2) is to be joined,
ab) a first support flange (6) to be applied against the upper side of the main girder (3) and fastened there with fastening means such as nails, and
ac) a second support flange (12) to be applied against the upper side of the secondary girder (2) and fastened there with fastening means such as nails,
each to be fastened to the contact face allocated thereto with nails of the like, and each provided with through bores for these fastening means, as well as
b) at least one elongate fastening means (11), such as a screw, to be introduced from the upper side of the one girder (2 or 3), obliquely relative to the fastening flange (4) and, in the assembled condition, passing through the plane of vertical extent of the fastening flange (4), or in other words extending into the other girder (3 or 2 respectively), wherein, in the top view of the end face of the main girder ...

[see original for figure]

RECEIVED
NOV 5 2002
JAMES R. CYPHER

11 OF 23

Description

The invention relates to a wood connector according to the preamble of claim 1, as is known from German Utility Model 29610381 U1.

In this wood connector designed for secondary or transverse girder joints and also referred to in practice as the "support brace", there is provided in, among other alternatives, the fastening flange that is also referred to in practice as the "web", at least one through bore, so that, after a pilot bore has been drilled via this through aperture or apertures into the secondary girders and this bore has emerged on the upper side of the beam to be connected, it becomes possible, in the manner of a hung assembly, to drive, for example, a rafter nail or a thumbscrew (without predrilling) selectively into the main girder, this structural provision being used in general for the purpose of positional stability or for the purpose of compensation for building tolerances, and the latter frequently being necessary to induce contact pressure between main and secondary girders.

Particulars in this regard can be found, for example, in "Static design analyses, Part 2", Form BBV 292, January 1993 revision of BULLDOG Beratungs- und Vertriebs-GmbH, wherein the diagrams provided illustrate that the rod-shaped connecting means driven through the said web aperture into the main girder is intentionally not supposed to make contact with the corresponding fastening flange (web), since the through aperture or apertures is or are designed, for example, with a diameter of 9 mm if, for example, a long-shank screw or a nail with a standard commercial diameter of up to 6 mm is to be used.

In this way it is intentionally ensured that, in such a Z-shaped support brace or profile designed according to the pertinent wood-construction standards, unwanted restraining stresses not taken into consideration in the design analysis cannot counteract the intended mode of action of the wood connector, so that the corresponding static design analyses can be consistently and also expressly said to lead to a "structurally possible arrangement", wherein there is no possibility of an increase of the forces on which the design analysis is based or of the calculated forces.

Compared with the foregoing prior art, the wood connector according to German Utility Model 29610381 U1 for the first time proposed a bore in the inverse manner, as it were, or in

other words via the support nose from the main girder toward the middle of the secondary girder. Therein it is also clear that contact with the web plate is not desired and therefore should also be avoided. Nevertheless, this arrangement or configuration of a wood connector of the class in question, while being achieved by the owner of the utility model, goes beyond the purely structural benefits, since the rod-shaped connecting means, when appropriately driven in, tends to counteract sagging of the wooden beam comprising the secondary girder in a certain manner or to a certain extent.

With the sheet-metal wood connector according to German Utility Model 29903749 U1, also achieved by the owner of the utility model, there was disclosed a wood connector which is T-shaped in longitudinal cross section and whose one support flange disposed horizontally in the direction of the secondary girder is entirely suitable for absorption of tensile forces. In a preferred embodiment, this flange always has the minimum necessary material cross section, while a fastening means disposed obliquely relative to the vertical extends from the upper side of the main girder through the first support flange into the secondary girder.

This wood-connector geometry does not necessarily have to comprise (one) multi-layer sheet-metal strip, however, but it can also be produced by an extruded profile or, for example, by a casting or by welded parts, although in such cases also, for reasons of cost and assembly, the structural thickness of the individual portions should not be greater than necessary and therefore routinely will also not be greater than necessary.

In such wood connectors, that fastening flange which is also referred to as the "support angle piece" must – depending on the type of construction – have the highest possible flexural and torsional stiffness, whereas that fastening flange which is also referred to as the "web" and which by design and regulation is generally subjected only to shearing stresses and strains is effective with a (generally much) smaller material thickness.

For example, German Patent 3641799 C2 discloses such a support brace whose upper fastening flange is approximately twice as thick as the web plate, which in general is disposed vertically and which, in the case of a joint made flush at the upper edges, must be countersunk to an appropriate depth in the main girder.

The object of the present invention is to improve the known wood connector while avoiding its respective disadvantages, in particular to the effect that the sheet-metal formed part

is effective with a material cross section that is as small as possible (for the particular application), wherein the fastening flange and the second support flange can have substantially identical thickness without need for considerable overdimensioning of the fastening flange, and wherein the stresses and strains imposed on the secondary girders to be joined when they are in assembled condition and under service load can be absorbed not only completely but also in a particularly expedient manner, and can also be determined by static analysis.

This object is achieved by the characterizing features of claim 1. Particularly expedient or preferred embodiments are described in the dependent claims.

Practical examples of the present invention will be explained in further detail hereinafter on the basis of practical examples. In some cases the explanations are obviously not specific to a given example, but relate very generally to the present invention. In the drawing:

Fig. 1 shows a side view of an inventive wood connector viewed along section line I-I in Fig. 2;

Fig. 2 shows a side view of the wood connector according to Fig. 1, turned by 90° and viewed in the direction of arrow II in Fig. 1; and

Fig. 3 shows the wood connector according to Figs. 1 and 2 in the finish-assembled condition;

Fig. 4 shows a diagram corresponding to Fig. 1 of a most preferred alternative version;

Fig. 5 shows a side view, corresponding to Fig. 2, of the sheet-metal connector according to Fig. 4, viewed in the direction of arrow V in Fig. 4;

Fig. 6 shows a top view of the sheet-metal formed part according to Figs. 4 and 5, viewed in the direction of arrow VI in Fig. 4;

Fig. 7 shows a somewhat schematic diagram of the wood connector according to Figs. 4 to 6 in the assembled condition/during assembly;

Fig. 8 shows a top view of a blank for the sheet-metal formed part of the inventive wood connector; and

Fig. 9 shows a perspective diagram of the sheet-metal formed part according to Fig. 8 for a wood connector according to the present invention.

Figs. 1 to 3 show a wood connector 1 for forming a concealed joint between the end face of a first beam 2 and a second beam 3 oriented crosswise relative thereto (see Fig. 3), the sheet-

metal formed part of the said connector being made from a thin sheet-metal blank having a thickness s of 3 mm.

Wood connector 1 has a fastening flange 4 which is to be applied against end face 2' of first beam 2 to be joined and which is also referred to in practice as the "web", as well as a first support flange 6, which extends away therefrom and which is to be applied against second beam 3. As is evident from Figs. 1 and 3 in particular, the sheet-metal formed part of wood connector 1 is made from a strip-like sheet-metal blank, from one end of which there extends fastening flange 4, which for the purpose of forming first support flange 6 is bent over a plurality of times by 90° or 180° as illustrated in the drawing and is shaped or machined (by metal-cutting techniques if necessary) in a certain way at several places.

For example, fastening flange 4 is provided with three mutually parallel rows of through bores 7, 8, whose longitudinal axes are oriented obliquely relative to the plane of fastening flange 4 (as far as outer through bores 7 adjacent to the rim are concerned), so that, in assembled condition, nails 11", which are to be driven through outer through bores 7 during assembly and which in Fig . 3 are indicated merely by broken lines, are oriented correspondingly obliquely relative to end face 2' of first wooden beam 2 or to the plane of fastening flange 4.

In contrast, the two through bores 8 in fastening flange 4 are formed therein in such a way that their longitudinal axes are oriented perpendicular to the plane of fastening flange 4.

Furthermore, fastening flange 4 is also provided in its upper portion with (at least) one through bore 9, which is produced by appropriate forming of fastening flange 4 and has the form of an appropriately formed extension 9', which is formed by a type of deep-drawing process. As is evident in particular from Figs. 1 and 3, longitudinal centerline 5 of this through bore 9 is also oriented obliquely relative to the plane of fastening flange 4 and so – in the assembled condition – relative also to the joined end face 2' of first beam 2. It coincides with the longitudinal centerline 5' of a through aperture 10 formed in first support flange 6 at a position adjacent to the free end portion thereof, and is allocated to through aperture 9 in fastening flange 4.

Before the significance and purpose of the two through apertures 9, 10 are further explained, it must also be pointed out that wood connector 1 – just as the wood connector according to German Utility Model 29903749 U1 – is provided with a second support flange 12, which in assembled condition rests with its underside 12' on upper side 2" of first wooden beam

2 (see Fig. 3).

Through apertures 9, 10 allocated to one another are used to accommodate a nail 11 (or if necessary a screw), which during assembly is driven (or screwed) in obliquely from above in the direction of arrow 16, after wood connector 1 has first been fixed in proper position against first wooden beam 2 by means of nails 11", which are driven in via through bores 7, 8, and after first beam 2 has been braced by the action of hanging first support flange 6 on upper side 3' of second beam 3 and properly positioned at the intended place. These two through apertures 9, 10 allocated to one another as a pair are dimensioned and disposed such that, while having a stiffening effect on the "angle element" formed by the two flanges 4, 6 by virtue of the nail 11 driven through them and penetrating them after assembly, they bear in form-closed relationship against the nail, so that portion A thereof, which in mounted condition extends between the two through apertures 9 and 10, forms, in the side view according to Figs. 1 and 3, the hypotenuse of a right-angled triangle, which has legs C and D and which correspondingly stiffens wood connector 1 against relative bending of its two flanges 4, 6 when it is under load (see arrow in Fig. 3).

This stiffening action, which is an essential objective of this embodiment, can obviously be further intensified (possibly considerably) by providing in flanges 4, 6 of wood connector 1 a plurality of pairs of through apertures 9, 10 allocated to one another for accommodation of a respective rod-shaped fastening element such as a nail 11. Such intensification is also possible in another embodiment, which obviously can also be additionally provided, by the fact that a screw is chosen respectively instead of a nail 11 as the rod-shaped fastening element. In this case, at least one through aperture 9 or/and 10 is then provided with an appropriate internal thread, which corresponds to the external thread of the screw, so that this – if necessary after preliminary production of a pilot bore – can be screwed in obliquely from above in the direction indicated by arrow 16. In this same case, the stiffening action can be further intensified if necessary by the fact that two through bores 9, 10 of a pair of through apertures allocated to one another are formed as threaded bores.

As already explained or at least indicated hereinabove, an extremely stable (meaning flexurally and torsionally stiff) wood connector 1 can obviously be created with simple means by the inventive provisions, specifically in such a way that, even when two flanges 4, 6 have the

same or at least substantially the same thickness (thus differing from the practical example illustrated in the drawing), essentially no superfluous material (due to choice of sheet metal that is too thick) is used. As an example, if the "web" (= fastening flange 4) is so dimensioned by choice of an appropriate thickness s, as is necessary for the given load L, first support flange 6 and second support flange 12 can be formed with substantially the same material thickness if necessary, because the loads occurring in the assembled condition under load L can nevertheless be absorbed by flange 6 or by flange 12 by virtue of the inventive stiffening.

From this information it is immediately obvious for the person skilled in the art that, if necessary, a corresponding feature can also be provided (alone or in addition) with respect to second support flange 12. In other words, this can also be provided if necessary with a through bore 10, which is oriented obliquely relative to the flange plane and whose longitudinal central axis 5' coincides with a further through bore 9 in fastening flange 4. In this case, however, this further through bore – because it is also obtained by appropriate forming of an extension 9' – is obviously a mirror image, as it were, relative to the plane of fastening flange 4, whereby further considerable stiffening of wood connector 1 can obviously be achieved in a manner that does not need to be described once again in detail here.

It must be further pointed out that a free rim of wood connector 1 – especially the rim adjacent to the vertex between flanges 4 and 6 – can be welded together with the portion of wood connector 1 positioned therebelow or thereabove, in which case it has usually proved sufficient when parallel portions bearing against one another (such as lower layer 6" of flange 6 and layer 6' disposed thereabove) are joined at one place 13 at least, for example by spot welding, although portions of the wood connector that are joined to one another such that they bear flatly against one another can also be glued to one another very effectively if necessary.

To ensure that the two beams 2, 3 are oriented such that their surfaces are flush with one another, second bearing flange 12 adjacent to fastening flange 4 can be offset sufficient in the direction of fastening flange 4 (in other words, downward) that its underside 12' is at least substantially flush with the underside of flange 6. This is not separately illustrated as an alternative in Fig. 3, but can undoubtedly be imagined without difficulty by the person skilled in the art.

Incidentally, the section modulus of the flange of wood connector 1 can be increased in

known manner by reinforcing at least one portion of a flange by at least one integrally formed bead, in which case, among other alternatives, it has proved extremely expedient for flange 6 and/or flange 12 to be provided with at least one continuous bead (not illustrated in the drawing) on the side opposite fastening flange 4, in a manner similar or identical to that provided in the wood connector according to German Utility Model 29903749 U1.

Although flanges 4, 6, 12 or portions of the flanges can in principle be formed entirely of one layer, as explained, it has usually proved expedient when – in this configuration in which there is used relatively thin sheet metal with a thickness of, for example, 1.5 or 2 mm – they have at least two-layer structure.

As already explained, the two flanges 4, 6 can if necessary have at least substantially the same number of layers. If fastening flange 4 has single-layer structure, flange 6 therefore usually has two-layer structure, and flange 12 in turn has single-layer structure (offset downward by the sheet-metal thickness, if necessary, as described hereinabove).

Incidentally, the width B of second support flange 12 can if necessary be greater than the width b of flange 6 and/or of fastening flange 4, although it also is entirely possible, if necessary, for the dimensions to be identical, as is the case in the practical example illustrated in the drawing.

Figs. 4 to 7 show a most preferred version of the inventive wood connector, wherein like parts, portions, etc. are denoted by like reference symbols as in the practical example according to Figs. 1 to 3.

In this configuration, oblique fastening means 11, designed as a screw, indeed also extends from the upper side of main girder 2 through fastening flange 4 into secondary girder 3, but in this case via an opening 17 located in fastening flange 4, without coming into contact with fastening flange 4, or underneath fastening flange 4, as illustrated, for example, in Fig. 7, where support flanges 6, 12 are now exploited only during assembly in order to hang secondary girder 2, and where the transverse forces derived from the service load, which statically is the sole concern, and acting on secondary girder 2 in the mounted condition, are directed exclusively to the screw or screws 11, which are capable of sustaining the stresses and strains due to the corresponding compressive forces, so that the stiffness necessary and also achieved by "hanging with an angle piece" in the case of the embodiment according to Figs. 1 to 3 is not even

necessary.

In order to apply the screw or screws 11 properly as intended, there can be used a tubular sleeve 18, which is a component of an assembly jig 19, which can be firmly clamped together with secondary girder 2 by means of a screw clamp 20 or the like.

In this configuration also the sheet-steel formed part 1', expediently protected against corrosion by means of an appropriate coating, is nailed or screwed to end face 2" of secondary girder 2 with (special) nails (such as 4.0 x 50) or screws (such as 5.0 x 40), for which purpose fastening flange 4 can be countersunk if necessary in end face 2'. Then secondary girder 2 can be hung on main girder 3 for the purpose of assembly and fastened to first support flange 6 with the same fastening elements. Finally – by means of assembly jig 19 already described hereinabove – at least one screw 11, which can also absorb compressive forces (such as SFS fastener WT-T-8.2 x 245 or WT-T-8.2 x 300), is screwed obliquely into the main girder. Alternatively, a plurality of screws can be used if necessary, in which case the screws can be arranged in a crosswise pattern.

In each case there is obtained, with the inventive wood connector, an extremely simple structure or construction that can be made inexpensively and used/assembled easily, while nevertheless having, after its assembly, such a large section modulus and thus corresponding flexural and/or torsional stiffness that heretofore such values have not been considered to be possible for wood connectors of the class in question.

Incidentally, in order to do justice to the economic viewpoints as well, the sheet-metal formed part is manufactured with relatively little waste from a blank such as illustrated in Figs. 7 and 8. The sheet-metal portion is already provided with the through bores, and it comprises a rectangular sheet-metal portion, whose thickness is 3 mm, whose width B is equal to the width of the three flanges 4, 6, 12 and whose length L is equal to the sum of the length 1 of second support flange 12 and length 1 of fastening flange 4, wherein the sheet-metal portion has, at a distance 1 from its one transverse rim forming second support flange 12, a bending line and, at a distance from its bending line – starting from its two longitudinal rims – cuts which are each oriented substantially at right angles to the respective longitudinal rim and whose length is shorter than the half width B/2 of the sheet-metal portion, as well as second cuts, which begin from the end of the said cuts and extend to the bending line. Furthermore, the portion forming fastening flange 4 has a central opening on the other side of the reference line.

List of reference symbols

1	Wood connector
1'	Sheet-metal formed part (of 1)
2	First wooden beam (secondary girder)
2'	End face (of 2)
2"	Upper side (of 2)
3	Second wooden beam (main girder)
3'	Upper side (of 3)
4	Fastening flange
4'	Contact face (of 4 against 2')
4"	Partial layer (of 4)
5	Longitudinal centerline
5'	Longitudinal centerline (of 10)
6	First support flange
6'	Upper layer (of 6)
6"	Lower layer (of 6)
7	Through bores (of 4)
8	Through bores (of 4)
9	Through bore (of 4 for 11)
9'	Extension (of 4 at 9)
10	Through aperture (of 6 for 11)
11	Screw
11'	Central axis (of 11 or 9 between 10)
11"	Screw
12	Second support flange
12'	Underside (of 12)
12"	Upper layer (of 12)
13	Spot weld

16	Arrow
17	Opening (in 4)
18	Tubular sleeve
19	Assembly jig
20	Screw clamp
s	Wall thickness
B	Width (of 12)
A	Portion (of 11 between 9 and 10)
C, D	Sides of triangle
L	Load (see Fig. 3).

Claims

1. A wood connector (1), especially for forming a substantially concealed joint between the end face of a first beam ("secondary girder") (2), which is made of wood or of a wood material and which in the assembled condition is under load, and a structural member, especially a second beam ("main girder") (3) oriented crosswise relative to the first beam (2), comprising

a) a sheet-steel formed part (1'), which is made substantially without waste from a sheet-metal blank and is bent over in portions such that it has three flanges (4, 6, 12), namely

aa) a fastening flange (4) to be applied against the end face (2') with which the secondary girder (2) is to be joined,

ab) a first support flange (6) to be applied against the upper side of the main girder (3) and fastened there with fastening means such as nails, and

ac) a second support flange (12) to be applied against the upper side of the secondary girder (2) and fastened there with fastening means such as nails,

each to be fastened to the contact face allocated thereto with nails of the like, and each provided with through bores for these fastening means, as well as

b) at least one elongate fastening means (11), such as a screw, to be

introduced from the upper side of the one girder (2 or 3), obliquely relative to the fastening flange (4) and, in the assembled condition, passing through the plane of vertical extent of the fastening flange (4), or in other words extending into the other girder (3 or 2 respectively), **characterized in that**, in the top view of the end face of the main girder (3) or in the side view of the secondary girder (2), the triangle described by the second support flange (12) or its horizontal plane of extent, by the fastening flange (4) or its vertical plane of extent, and by the (at least one) oblique fastening means (11) or its oblique longitudinal axis (5') is structurally formed such that its angle element formed by its two legs (4, 12) has adequate stiffness and can also absorb compressive forces in its hypotenuse, which is formed by the oblique fastening means (11),wherein the oblique fastening element (11) extends obliquely from the upper side of the secondary girder (2) and passes therethrough into the main girder (3).

2. A wood connector according to claim 1, characterized in that the (at least) one fastening means (11) to be introduced obliquely is designed as a screw or special nail, which in the assembled condition passes without contact through the fastening flange (4) or the vertical plane of extent of the fastening flange (4).

3. A wood connector according to claim 1, characterized in that the two through apertures (9, 10) allocated to one another (in respective pairs) are (each) dimensioned and arranged such that, while creating stiffening of the "angle element" formed by the two flanges (4, 6) by means of the rod-like fastening element (11) to be driven through them and penetrating them after assembly, they bear, in the finish-assembled condition of the wood connector (1), in form-closed relationship against the fastening element (11), so that its portion (A) extending in the assembled condition between the two through apertures (9, 10) forms – in side view – the hypotenuse of a right-angled triangle (whose further sides are C and D), which correspondingly stiffens the wood connector (1) while it is under load (L) against relative flexure and/or torsion of its two flanges (4, 6) and/or of the second support flange (12).

4. A wood connector according to claim 3, characterized in that a plurality of pairs of through apertures (9, 10) allocated to one another is present in the fastening flange (4) and in the second support flange (12) in order to accommodate a respective rod-like fastening element (11).

5. A wood connector according to claim 3 or 4, characterized in that the through apertures (9, 10) are formed as through bores.

6. A wood connector according to claim 5, characterized in that the rod-like fastening element (11) is formed as a screw for at least one pair of through bores (9, 10) and in that at least one through aperture (such as 9) of the pair of through apertures (9, 10) in question is provided with an (internal) thread, which corresponds to the (external) thread of the screw.

7. A wood connector according to claim 6, characterized in that both through bores (9, 10) of a pair of through apertures (9, 10) allocated to one another are formed as threaded bores.

8. A wood connector according to one or more of claims 3 to 7, characterized in that a free rim of the wood connector (1) – especially the rim adjacent to the vertex between the first fastening flange (4) and a support flange (6) – is welded together with the portion of the wood connector (1) disposed therebelow or/and thereabove.

9. A wood connector according to one or more of claims 3 to 8, especially according to claim 6, characterized in that parallel portions (such as 6', 6") of the wood connector (1) disposed so as to bear against one another are joined to one another at one place (13) at least.

10. A wood connector according to claim 9, characterized in that portions of the wood connector (1) joined to one another are joined to one another by (spot) welding or the like.

11. A wood connector according to claim 9, characterized in that portions of the wood connector (1) joined to one another are glued – preferably flatly.

12. A wood connector according to one or more of claims 3 to 11, characterized in that at least one layer (6') of the first support flange (6) is lengthened toward the (first) beam (2) to be joined in a manner known in itself, as is the case from the fastening flange (4)

toward the second support flange (12).

13. A wood connector according to claim 12, characterized in that the second support flange (12) adjacent to the fastening flange (4) is sufficiently offset in the direction of the fastening flange (4) that its underside (12') is substantially flush with the underside of the first support flange (6).

14. A wood connector according to one or more of claims 3 to 13, characterized in that through openings (7, 10) of at least the fastening flange (4) or of the first support flange (6) are formed at least partly in a manner known itself that they form an oblique compulsory guide for the respective connecting means or rod-shaped fastening element (11) which is to be driven therethrough and whose central axis (11') is not oriented at right angles to the flange in question (such as 4) or its contact face (4').

15. A wood connector according to one or more of claims 3 to 14, characterized in that at least one portion of a support flange (6; 12) is reinforced by at least one integrally formed bead or the like for the purpose of increasing its section modulus.

16. A wood connector according to claim 15, characterized in that the first support flange (6) and/or the second support flange (12) is provided in a manner known in itself with at least one substantially continuous bead on the side opposite the fastening flange (4).

17. A wood connector according to one or more of claims 12 to 16, characterized in that all flange portions (4, 6, 12) of the wood connector (1) have substantially two-layer structure.

18. A wood connector according to one or more of claims 3 to 17, characterized in that the fastening flange (4) and the first support flange (6) have substantially the same number of layers (such as 6', 6").

19. A wood connector according to claim 18, characterized in that the fastening flange (4) and the first support flange (6) have substantially continuous single-layer structure.

20. A wood connector according to one or more of claims 12 to 19, characterized in that the second support flange (12) has single-layer structure, the fastening flange (4) has two layer structure and the first support flange (6) has three layer structure.

21. A wood connector according to one or more of claims 8 to 20, characterized in that the width (B) of the second support flange (12) is larger in a manner known in itself that

the width (b) of the first support flange and/or of the fastening flange (4).

22. A wood connector according to one or more of the preceding claims, characterized in that a through aperture (such as 9) is formed in a single-layer or multi-layer fastening flange (4; 6) in a substantially cylindrical or frustoconical structure (9') of the flange (4 or 6) in question or of the flange location in question, in the form of a correspondingly shaped extension (9'), which surrounds the corresponding through bore (9) substantially concentrically.

23. A (sheet-metal) blank for the formed part of the wood connector (1) according to one or more of the preceding claims, characterized by a rectangular sheet-metal portion – preferably provided with through bores – whose width (B) is equal to the width of the three flanges (4, 6, 12) and whose length (L) is equal to the sum of the length (1) of the second support flange (12) and the length (1) of the fastening flange (4), wherein the sheet-metal portion has, at a distance (1) from its one transverse rim forming the second support flange (12), a bending line and, at a distance from its bending line – starting from its two longitudinal rims – cuts which are each oriented substantially at right angles to the respective longitudinal rim and whose length is shorter than the half width (B/2) of the sheet-metal portion, as well as second cuts, which begin from the end of the said cuts and extend to the bending line; and wherein the portion forming the fastening flange (4) has a central opening on the other side of the reference line.

Attached hereto: 3 pages of drawings

– Blank page –

EV 183648204

Nummer: DE 100 61 793 A1
Int. Cl.⁷: E 04 B 1/38
Offenlegungstag: 31. Mai 2001

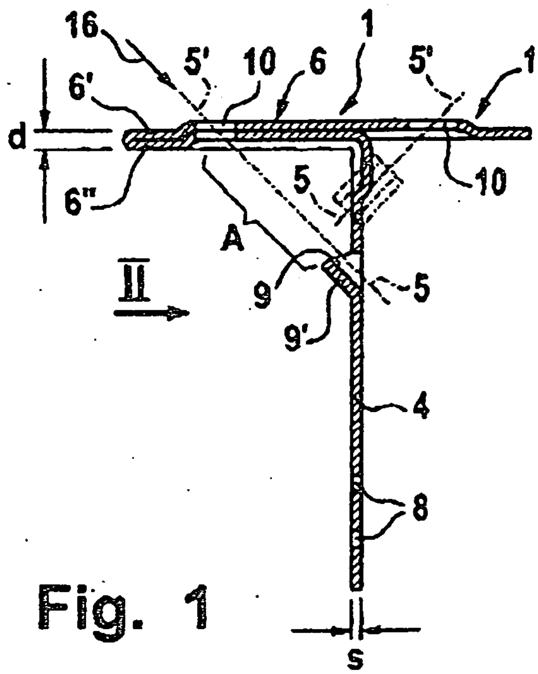


Fig. 1

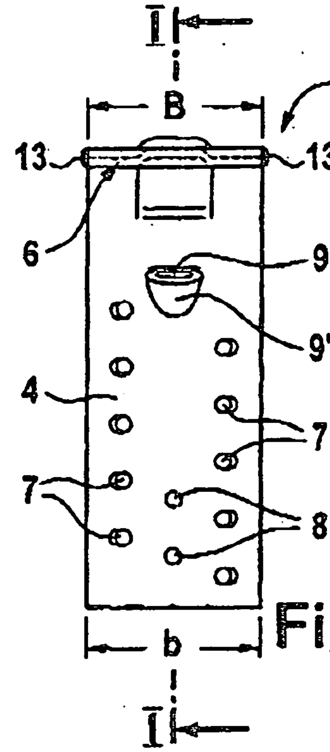


Fig. 2

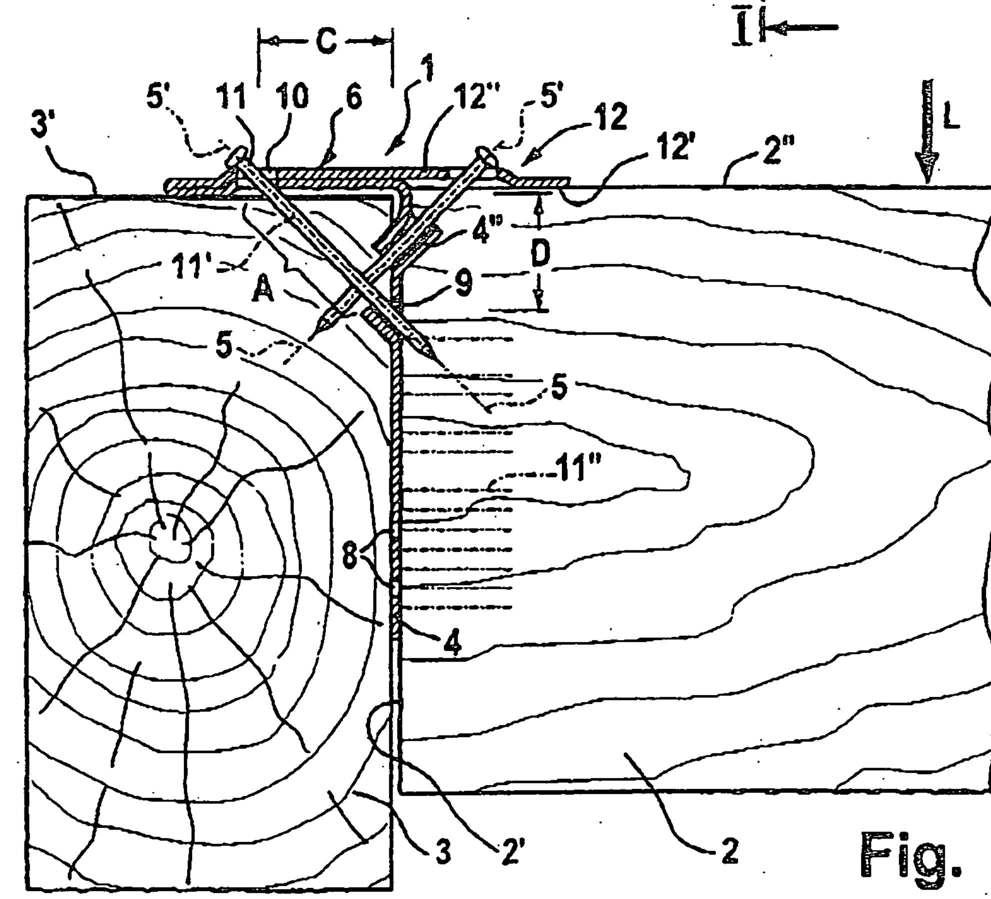
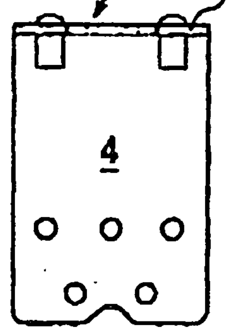


Fig. 3

Nummer: DE 100 51 793 A1
Int. Cl.⁷: E 04 B 1/38
Offenlegungstag: 31. Mai 2001



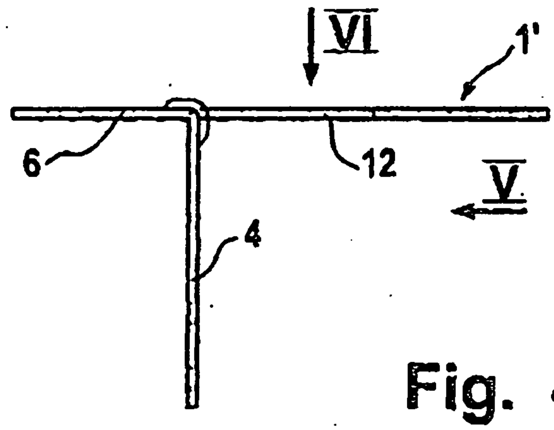


Fig. 4

Fig. 5

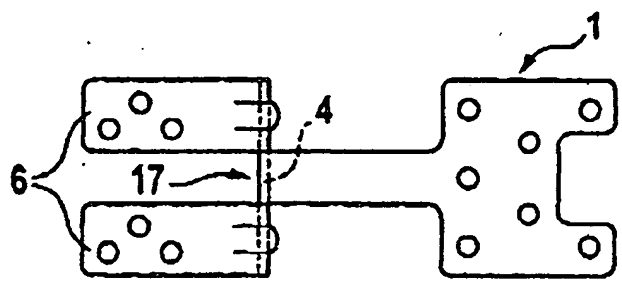


Fig. 6

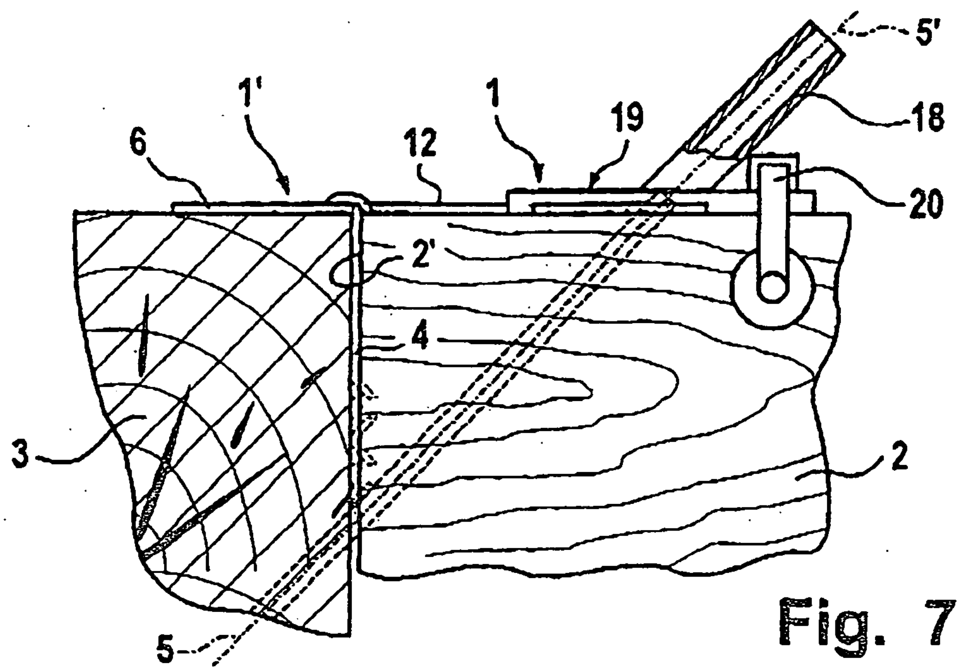


Fig. 7

EV 183648204

Nummer: DE 100 51 793 A1
Int. Cl.[7]: E 04 B 1/38
Offenlegungstag: 31. Mai 2001

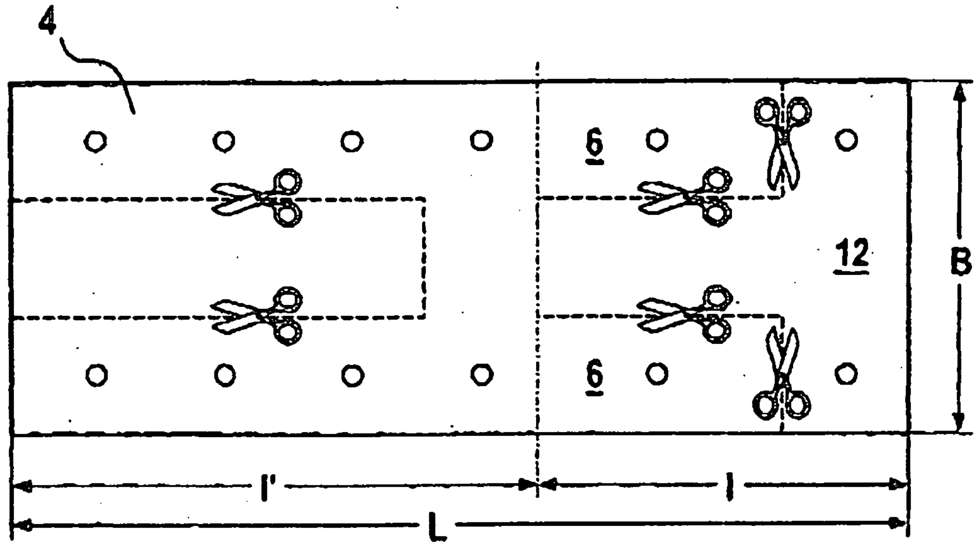


Fig. 8

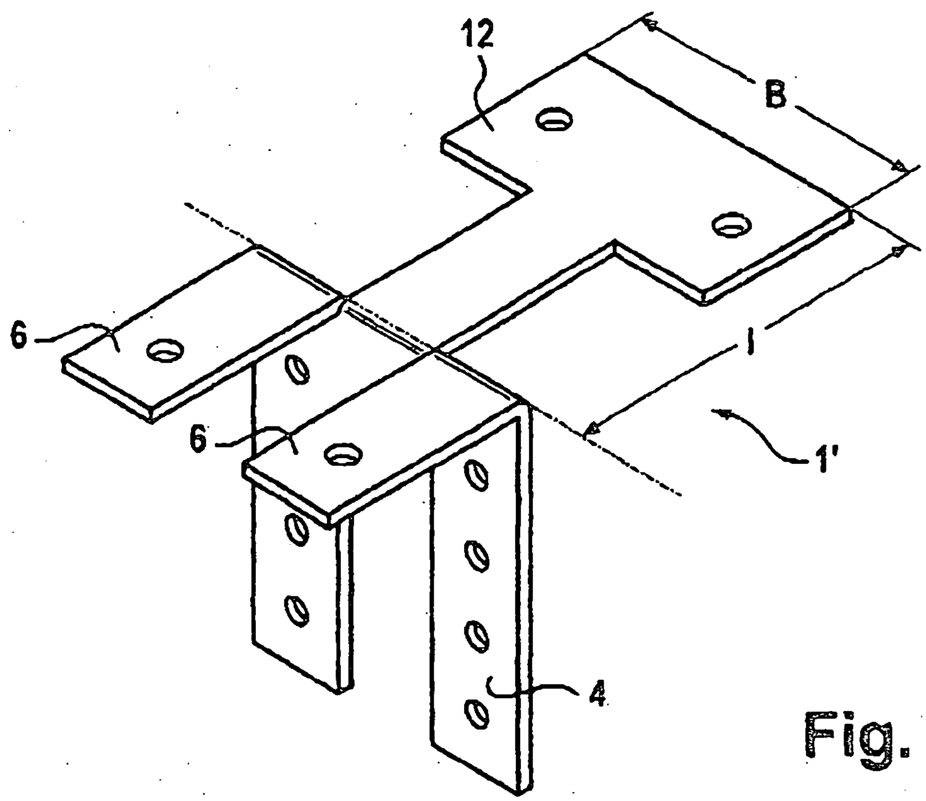


Fig. 9

Translator's notes re DE 10051793

1. The abstract is a duplicate of claim 1 up to the characterizing clause, and then it ends abruptly with ...

2. Part of the last paragraph on p. 8 (German column 5, lines 50-52) is ungrammatical, reading approximately "transverse forces of the service load acting from the [missing noun] on secondary girder". The best guess as to what was intended is "transverse forces derived from the service load ... and acting on secondary girder".

3. Last par. on p. 9:
   Figs. 7 and 8 should be Figs. 8 and 9

4. Also in last par on p. 9 (same discrepancies in claim 22):
   length of flange 12 should be l (not 1); length of flange 4 should be l' (not 1); "distance 1" should be "distance l"; "reference line" should probably be "bending line".

5 List of symbols:
   11' should probably read ... (of 11 or 9 or 10), not "between 9 or 10"
   [the abbreviation bzw. = "or"; "zw." = "between", but thought to be a misprint for "bzw."]

6. Claim 12 is ungrammatical. The translation is as close as possible, but a more logical phrasing would be something like: "...in a manner known in itself, just as the second support flange (12) is lengthened outward from the fastening flange (4)."
   This claim does not have a corresponding paragraph in the description.

RECEIVED
NOV 5 2002
JAMES R. CYPHER

EV183648204

SFS WT SYSTEM OF MERK MERK

You can also exploit the advantages of the SFS WT system:

ECONOMY

Marked reduction of processing time because of fewer working operations

SAFETY

Safe and comfortable processing with optimized assembly aids,
Example: ZL-WT clamping fixture

[see original for two photographs]

GREAT ECONOMY BY SAVING OF WORKING OPERATIONS

With the newly developed SFS WT system, consisting of a fastener designed specially for the application, it is possible to achieve additional cost-reduction potentials. Compared with traditional methods, the joint is made in one working operation – without pre-drilling.
The double thread ensures form-closed anchoring, and so there is no need for retightening.

SECURE FASTENING

The SFS WT system was developed specially for safe wood-to-wood joints capable of withstanding static loads. The double thread of the special screw guarantees that the parts will be drawn together and held in form-closed relationship by strong, mutually matched retaining forces. The small head diameter minimizes the splitting tendency.

MERK
CONSTRUCTION PRODUCTS

[see original for address and telephone information]

DIRECT LINE
Tel. [see original]
Mon-Fri 6 am to 9 pm
Sat 9 am to 6 pm
Sun and holidays 10 am to noon

SFS WT SYSTEM OF MERK

MERK

PRACTICAL EXAMPLES

[see original for photographs]

Anchoring of rafters to make them resistant to being sucked upward

Reinforcement of mortised beams

Attachment of purlins and coupling purlins

Reinforcement of openings

DURABLE QUALITY

The SFS WT system guarantees flawless and constant joining of wood substructures for any application. Thus problems such as warping in the roof plane are prevented and the roof remains durably leaktight – to the delight of the contractor and of the building owner. This quality improvement extends the useful life and optimizes the economics for you and your customers.

If you need information on further practical possibilities for economic use of WT fasteners please do not hesitate to call us. Our trained advisers are ready help you with word and action.

SFS WT-T-8.2 X L FASTENER PRODUCT LINE

Type	Material T = carbon steel	Diameter (mm)		Length (mm)	Min. purlin cross section b x h (cm)
WT	T	8.2	x	160	7 x 14
WT	T	8.2	x	190	8 x 16
WT	T	8.2	x	220	9 x 18
WT	T	8.2	x	245	10 x 20
WT	T	8.2	x	300	12 x 24

RECEIVED
OCT 2 0 2002
JAMES R. CYPHER

E 183648204

close cooperation with a manufacturer of laminated wooden components. This traditional wood joint has long been regarded as unprofitable. By virtue of the use of modern CNC-controlled, fully automatic binding machines equipped with diverse tool sets, however, the machining time has been shortened to less than 2 minutes and is thus economical once again. In its applications for light to moderately heavy wood joist ceilings and wood framing, this joint can be used without any kind of steel parts.

[see original for photograph]

Principle of joining by screws

Practical diploma studies

As part of a diploma study currently in progress, the load-bearing and deformation behavior of dovetail and tenon joints is being investigated in

[see original for photograph]

Radiograph of boards joined by screws

One student explored completely uncharted territory during his diploma study, by measuring stiffness and strength values of stacked-board bridges held together by screws. The stacked-board construction has long been known, but what is new is that bridges over which even heavy trucks can be driven are being built with this construction principle. In the past, transverse pretensioned steel reinforcements were used as the fastening means. Now, however, the first study of wood screws as the fastening means has been undertaken in the Wood Construction Department. The student was given the opportunity to perform his tests at the Federal Materials Testing and Research Institute (EMPA) in Dübendorf (Switzerland), together with Ulrich Meierhofer, who developed this special construction system.

EV183648204

Section 5. Identification of Person Making This Information Disclosure Statement

The person making this certification is:

a. the practitioner who signs below on the basis of the information in the practitioner's file.

Date: December 5, 2002

James R. Cypher

James R. Cypher
Registration No. 22448
Law Offices of James R. Cypher
405 14th Street, Suite 1607
Oakland, CA 94612
510-832-4111
Customer No. 000498